



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

AS

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/386,247	08/31/1999	KEVIN J. TOREK	MICRON.06A/9	1200

7590 12/05/2001

Knobbe Martins Olson & Bear LLP  
620 Newport Center Drive  
16th Floor  
Newport Beach, CA 92660

EXAMINER

TRAN, BINH X

ART UNIT	PAPER NUMBER
----------	--------------

1765

DATE MAILED: 12/05/2001

7

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/386,247

Applicant(s)

TOREK ET AL.

Examiner

Binh X Tran

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 6-9, 15-35 and 41-62 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6-9, 15-35 and 41-62 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 6-9, 16-35, 41-62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bergman et al. (US 6,273,108) in view of Boley (US 6,132, 629).

Bergman discloses an apparatus comprising:

an ozone source (75) configured to supply ozone to process chamber (15);

a nozzle (40) (read on "sprayer") connected to a fluid sources such that fluid sprays over a workpiece (20) in the process chamber (col. 4 lines 20-25);

a pump (55) connected to the fluid source (i.e. reservoir 45).

Bergman does not disclose a selector valve connected to the pump to selectively pulse the fluid through the sprayer (i.e. the nozzle 40). In an apparatus for supplying ozonated water, Boley discloses that a mean for supplying ozone water in both continuous and intermittent operation (Note: a mean for supplying ozone in intermittent operation read on the limitation of "selector valve connected to the pump to selectively pulse the fluid through the sprayer", See col. 10 lines 1-10, col. 14 lines 15-19).

It would have been obvious to one having ordinary skill in the art, at the time of invention, to Bergman in view of Boley, by using a valve to pulse the fluid through the

sprayer because this will allow more flow control, increased efficiency and reliability. Further Bergman is not particular whether the fluid is flown continuously or intermittent (i.e., continuous vs. pulse) therefore pulsing would produce an expected result.

Respect to claim 7, Bergman discloses the workpiece is an semiconductor wafer (20) (See col. 4 lines 3-7). Respect to claims 8-9, Bergman discloses the apparatus comprise a support or cassette (25) that holds a plurality of semiconductor wafer (20) wherein the cassette can be rotated using the rotor assembly 30 (See col. 4 lines 12-20).

Respect to claim 16, Bergman discloses the rotational speed of 300-800 rpm (col. 6 lines 30-31). The cited prior art differs from the instant invention by the specific value of rpm. The rotation per minute parameter is commonly determined by routine experiment. The process of conducting routine optimization experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one of ordinary skill in the art, at the time the invention to modify Bergman by perform routine experiments to obtain optimal result. Further Bergman is not particular about the specific number of rpm and therefore any number would have produced an expected result.

Respect to dependent claims 17, 27 Bergman teaches at least one processing chamber wherein ozone rich environment exists within the object processing chamber; and a sprayer, a pump connected to the chamber. Bergman does not teach pulsing fluid source, the fluid source configured to pulse a solution through the sprayer into the ozone rich environment.

In an apparatus for supplying ozonated water, Boley discloses that ozonated water can be supplied in both continuous and/or intermittent mode (Note: intermittent is the same with "pulsing", See col. 10 lines 1-10, col. 14 lines 15-19).

It would have been obvious to one having ordinary skill in the art, at the time of invention, to Bergman in view of Boley, by pulsating the ozone-rich solution because this will allow more flow control, increased efficiency and reliability. Further Bergman is not particular whether the fluid is flown continuously or intermittent (i.e., continuous vs. pulse) therefore pulsing would produce an expected result.

Respect to claims 18-19, 28, Bergman discloses the solution is ozonated (i.e., ozone rich) and the solution combines with ozone (from ozone generator) in the ozone rich environment or in the processing chamber (15). Respect to claim 20, Bergman discloses a plurality of spray nozzles 40 (See Fig 1). Bergman further discloses a plurality of spray nozzles that sprays the fluid into the semiconductor process chamber (15) (claim 29).

Dependent claims 21-26 and 30-35 differ from the cited prior by the specific number pulse per unit of time, duty cycle. These parameters are commonly determined by routine experiment. The process of conducting routine optimization experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, It would have been obvious to one of ordinary skill in the art, at the time the invention, to perform routine experiments to obtain optimal result. Further the selection of particular values for these parameters is simply a design choice base on routine experiments.

Respect to claims 41, Bergman does not disclose the pump configured to pulse a solution into the processing chamber. Boley discloses a flow of fluid via pump (7) can be either continuous of intermittent. Boley further discloses the pressure set point on gauge 17 configure with pump to control intermittent operation (col. 9 lines 58-67 to col. 10 lines 1-10).

It would have been obvious to one of ordinary skill in the art, at the time the invention, to modify Bergman in view of Boley by configuring the pump to pulse the solution because fluid because this will allow more flow control, increased efficiency and reliability. Further Bergman is not particular whether his fluid is flow continuous or non-continuous (i.e., continuous vs. pulse), therefore pulsing would produce an expected result.

The limitation of claim 42 has been discussed. Bergman does not teach the pump activates and deactivates to create the pulse (claim 43); or the pump further comprises a switching mechanism to create the pulse (claim 44); or the switching mechanism comprises a device configured to divert solution from one area of the processing chamber to another area (claim 44).

Boley discloses that the flow of service water (via pump 7) can be terminated and withdrawn again to perform intermittent operation (i.e. pulse) (col. 9 lines 58-67 to col. 10 lines 1-10, read on "activates and deactivates the pump"). Boley also teaches a gauge (17) or flow switch (54) to create intermittent operation from one area to another area (i.e., "switching mechanism").

It would have been obvious to one of ordinary skill in the art, at the time the invention, to modify Bergman in view of Boley by activating and deactivating pump, using switching mechanism to divert solution because this will allow more flow control, increased efficiency and reliability. Further Bergman is not particular whether his fluid is flow continuous or non-continuous (i.e., continuous vs. pulse), therefore pulsing would produce an expected result.

Respect to claim 46 Bergman discloses pumping a solution into an ozone rich environment to create an ozone rich solution. The limitation of a pulsator has been discussed in Boley's reference in previous paragraph.

Respect to claim 47, Bergman disclose a spray nozzle (40). Bergman teaches the solution is water (claim 48).

Claims 49-52 differ from the cited prior art by the specific temperature of the solution. Temperature parameter is commonly determined by routine experiment. The process of conducting routine optimization experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one of ordinary skill in the art, at the time the invention, to conduct routine experiments to determine optimal condition as expected result.

Respect to claims 54 and 62 Bergman teaches a rotator 30 that is configured to rotate a work-piece (read on a rotating platform). All other the limitations of claims 53-62 have been discussed in previous paragraph.

3. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bergman et al. (US 6,273,108) in view of Kasting, Jr. et al. (US 5,598,316).

Art Unit: 1765

Bergman disclose a reaction chamber comprising:

a gas input (from the ozone generator 75);

a plurality of nozzles (40);

a wafer cartridge holding wafer (25)

a first fluid flow line (70) connect to the nozzle (40)

a second water (105) configured to divert water flow away from the chamber which connect to the fluid flow line (70) (read on "divert water flow away from the first fluid line).

Bergman does not disclose that the nozzles connected to a nozzle manifold. In an ozonated apparatus, Kasting disclose a manifold to supply ozonated water to the chamber (See col. 6 lines 48-56).

It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Bergman in view of Kasting by utilizing the manifold connect to a plurality of nozzle because it would allow the flow to be more distributed.

#### ***Response to Arguments***

4. Applicant's arguments with respect to claims 6-9, 15-35, 41-62 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Conclusion***

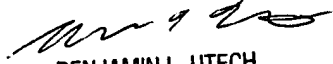
5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-1867. The examiner can normally be reached on Monday-Thursday and every other Friday.



If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Binh X. Tran  
November 26, 2001

  
BENJAMIN L. UTECH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700